



Issue No. 5 August 2003

From the Editor

Since the start of our ecological survey programme in 2002, we have been busy collecting, compiling and analyzing the data collected. However, some may not be aware of the progress of the programme and interested parties outside AFCD may have difficulty in accessing the information and results.

We have already taken steps to disseminate the results of our surveys through sending copies of this AFCD internal newsletter to outside parties upon request, while stock lasts. To further increase circulation of this newsletter, we will keep a "subscription list" and send copies of future issues to those on the list. If you know anyone (either within or outside AFCD) who is interested in receiving a copy of this newsletter, please let me know.

Progress of the ecological survey programme is moving on rapidly. It is particularly exciting to witness new records being made for Hong Kong, including the four new dragonfly, and one butterfly, records reported in this issue.

Although Hong Kong is becoming one of the best-studied cities in the world in terms of its biodiversity, there is still more to be discovered. In particular, the small size and patchiness of our habitats require a much higher resolution in our knowledge on the distribution of local fauna and flora for their conservation. We will need to work harder to improve our understanding of local biodiversity.

P. M. So

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Feature Article

The Population and Breeding Ecology of White-bellied Sea-eagles in Hong Kong

TSIM Siu-tai, LEE Wai-hung, CHEUNG Chi-sun,
CHOW Ka-lai, MA Yin-nin, LIU Ka-yip
Bird Working Group

本文報告鳥類工作小組在2001年11月至2003年5月在全港觀察白腹海鵬的部份結果，包括白腹海鵬在全港的分佈、數目、巢數、以及繁殖期間的覓食行為，為了解本物種在香港的情況提供最新的資料。

Introduction

White-bellied Sea-eagle *Haliaeetus leucogaster* (WBSE, 白腹海鵬) is one of the ten species of fish eagle

in the world, belonging to the Family Accipitridae (鷹科) (Ferguson-Lees and Christie, 2001) (Figure 1). It occurs from India and Sri Lanka, through southeastern Asia to Australia and Tasmania. The global population of breeding adults, non-breeders and immatures is estimated to be over 10,000 (del Hoyo *et al.*, 1994; Ferguson-Lees and Christie, 2001).

WBSEs are specialists in coastal areas and offshore island. Juveniles are dispersive in nature, but breeding males and females usually form permanent pairs and are mostly sedentary once a home range has been established. They are monotypic but females are slightly larger. Nests are usually near water, in tall trees, living or dead, or on remote coastal cliffs (Clunie, 1994). The nests may be used for several years. WBSEs are opportunistic carnivores, with a wide range of prey foods, including fish, reptiles,

birds, mammals and carrion (Clunie, 1994; Zheng and Wang, 1998; Ferguson-Lees and Christie, 2001).

WBSE is known as an uncommon resident along the coasts of southeastern China, including Hong Kong, Guangdong, Fujian and Hainan and rarely in Jiangsu and Taiwan (Zheng and Wang, 1998; MacKinnon and Phillipps, 2000; Carey *et al.*, 2001), suggesting that southeastern China is the northern limit of natural distribution of this species.

Like all wild birds in Hong Kong, WBSEs and their eggs and nests are protected by the Wild Animals Protection Ordinance (Cap. 170). In addition, the import and export of WBSEs are controlled by the Animals and Plants (Protection of Endangered Species) Ordinance (Cap. 187). WBSE is listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), but they are not globally threatened. It is listed in the China - Australia Migratory Birds Agreement, signed in Canberra in 1986, under which both countries agree to co-operate in the protection of migratory birds and their environments.

Objectives

To improve our understanding of local WBSEs, we carried out a study to:

- (i) Record the local distribution of the species.
- (ii) Estimate the local population size.
- (iii) Characterize the nests and nesting sites.
- (iv) Monitor the behaviour of breeding birds.

This paper summarizes the key findings of the study.

Key Findings

Distribution and Population of WBSEs

More than 100 sighting records of WBSEs were obtained between November 2001 and May 2003 (Figure 2). After excluding any possible double counting of the same individual, it is estimated that

there was a total of 39 WBSEs in Hong Kong, including 23 adults and 16 immatures/juveniles (12 immatures and four unfledged juveniles) as at the end of May 2003. This is based on records of 23 individual records of sedentary adults, four unfledged juveniles that were still staying in nests, and four juveniles seen perched close to each other at the same place and time. The other sighting records of juveniles were re-examined and considered as eight individual juvenile WBSEs.

In general, most of the WBSEs inhabit the eastern waters of Hong Kong (20 birds or 51.3% of the local population) and the southern waters and harbour areas (14 birds or 35.9% local population), whereas the western waters support fewer WBSEs (5 birds or 12.8% local population). In addition, WBSEs were frequently observed perching, foraging or bathing around five of the Hong Kong reservoirs, namely High Island, Plover Cove, Kowloon, Tai Lam Chung and Tai Tam.

A small gathering of four immatures/juveniles was observed at the shore of Wang Tau Tun in High Island Reservoir on 29 December 2002. This record is the largest aggregate of WBSEs in this study. Three WBSEs were also recorded flying close to each other at three locations including Hung Shek Mun (26 July 2002), Stonecutters Island (28 July 2002) and Kowloon Reservoir (12 November 2002). Outside Hong Kong, gatherings of up to about 14 immatures have been observed (Ferguson-Lees and Christie, 2001).

Number and Density of WBSE Nests

Eight nests were confirmed in Hong Kong by this study (Figure 3). The nests at Tai Ngam Hau (Sai Kung) and Tsim Chau were newly reported by AFCD, and the nest on Stonecutters Island by the Kite Research Group of Hong Kong Bird Watching Society (HKBWS) in 2003. Based on the sighting records, it is suspected that there may be at least two additional nests at Chi Ma Wan and Tai Tam, adding to as many as ten breeding pairs of

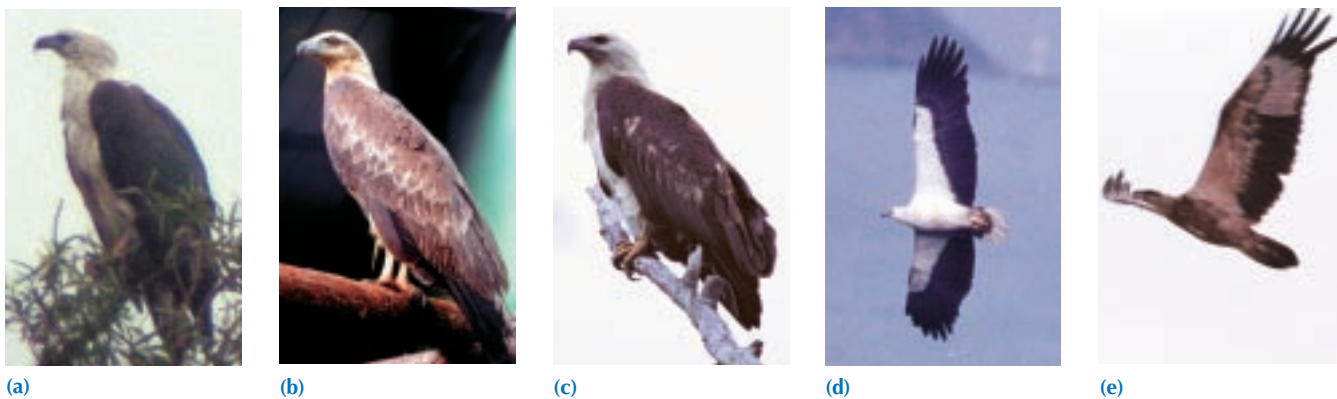


Figure 1 (a) Adult WBSE, its head, neck, distal half of tail, and whole under-part and thighs white; back and wing-coverts dark brownish-grey; (b) juvenile WBSE, head, neck and under-part creamy color with brown stripes, scaled brown back and wing-coverts; (c) sub-adult WBSE, less brown and more grey above and white below with more uniform black at base of tail; (d) adult WBSE in flight showing long broad wings, narrow head on well protruding neck and short wedge-shaped tail; (e) juvenile WBSE in flight showing pale-streaked brown in lower-part, whitish diagonals/windows, dark tail-band.

Note: birds in figure 1(a) - (e) are different individuals

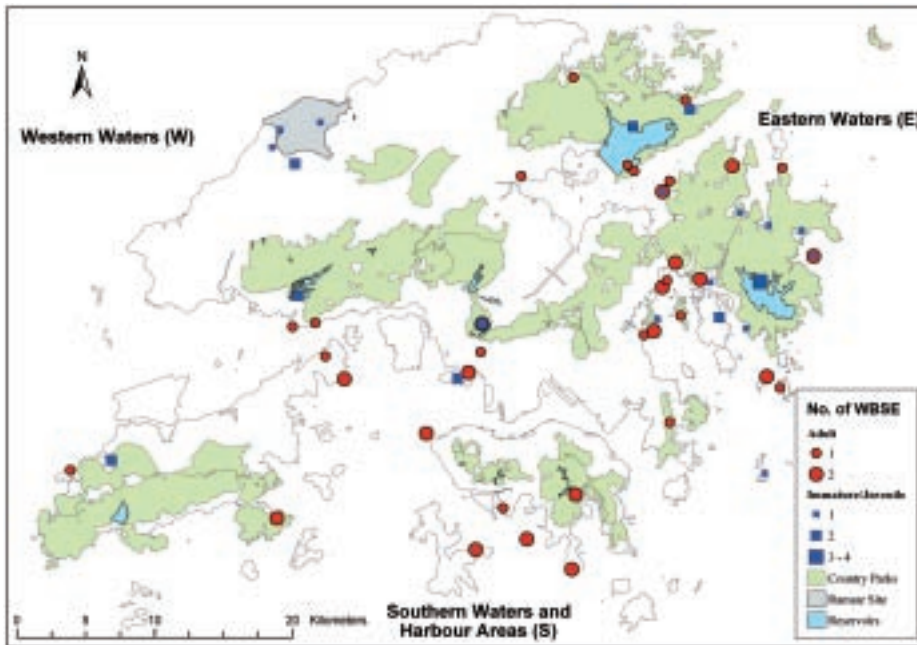


Figure 2 Locations of sighting records of WBSEs from November 2001 to May 2003.

WBSEs in Hong Kong. The number of breeding pairs (8 - 10) is comparable to previous findings in the mid-1990's (Carey *et al.*, 2001), implying a steady breeding population size of WBSEs in Hong Kong.

The shortest distance between nests varies from 3.4 - 14.4 km, with a mean distance of 8.9 km (Figure 3). Since the total length of Hong Kong's coastline is about 1,100km, there is about one pair of WBSE per 110 km (assuming 10 breeding pairs) to one pair per 140 km (assuming eight breeding pairs) of coastline in Hong Kong.

Characteristics of WBSE Nests and Nesting Sites

Both native and exotic tree species were used for nest building by local WBSEs. At least five tree species, including *Ficus variegata var. chlorocarpa* (青果榕), *Ficus microcarpa* (榕樹), *Acacia confusa* (台灣相思), *Machilus sp.* (楠屬) and *Cinnamomum camphora* (樟), were recorded being utilized for nesting by WBSEs in Hong Kong. Among these, *Ficus sp.* seems to be more commonly utilized as a host tree. Unidentified species of dead trees, covered with climbers, were utilized as host trees by the pairs in Sham Chung and Tsim Chau.

Of the eight characterized nests, the median nest diameter and depth is about one meter (range: 1 - 2 meters) and 0.5 meter (range: 0.3 - 1 meter) respectively. The

median altitude of nests is about 40 meters above sea level (range: 8 - 80 meters). The median shortest distance of the nest to coast is about 40 meters (range: 5 - 350 meters). All the eight known nests are located on government land, and two of them (at Sham Chung and Tai Ngam Hau) are inside Country Parks.

The orientation of the nests may be related to the prevailing wind direction during the breeding season. Wind data from Hong Kong Observatory in 1999-2002 shows that easterly winds (NE - SE) occurred in more than half of the days during the breeding season from October

to May next year, while seven out of the eight characterized nests face westward, which would give more protection to the nests and the nestlings during the chick-rearing period.

Number of Chicks Raised, 2002/2003

In year 2002/03, four juveniles from three breeding pairs (two in Tai Ngam Hau, one in Sham Chung and one in Tsim Chau) fledged, while no successful breeding was recorded for the four breeding pairs on Yeung Chau, Wong Ma Kok, Pa Tau Kwu and Green Island. There is no information on the breeding activities of the pair on Stonecutters Island. About half of the breeding pairs of WBSE successfully raised chicks in Hong Kong in 2003. Further studies would be required to estimate the overall breeding success and to assess the local population trend.

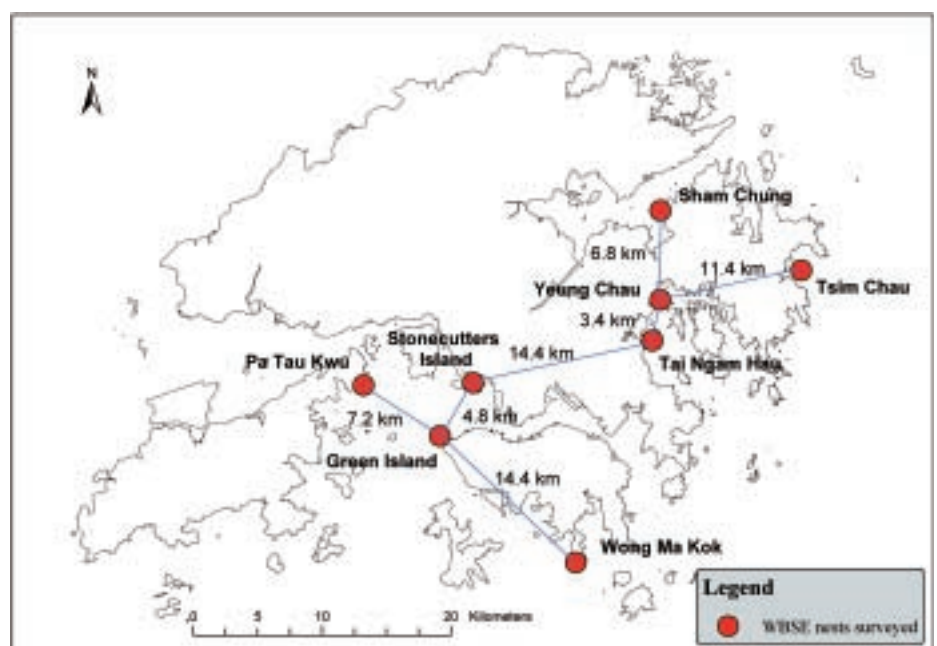


Figure 3 Locations of WBSE nests surveyed in this study. Shortest distance between two nearest nests of WBSE is shown.

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References

- Campbell, B. and Lack, E., 1985. *A Dictionary of Birds*. The British Ornithologists' Union, London.
- Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L., 2001. *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.
- Clunie, P., 1994. *Plants and Animals: Flora and Fauna Guarantee: Action Statement No. 60: White-bellied Sea-eagle Haliaeetus leucogaster*. Department of Natural Resources and Environment, Australia.
- del Hoyo, J., Elliott, A. and Sargatal. eds., 1994. *Handbook of the Birds of the World. Vol. 2: New World Vultures to Guinea-fowl*. Lynx Edicions, Barcelona.

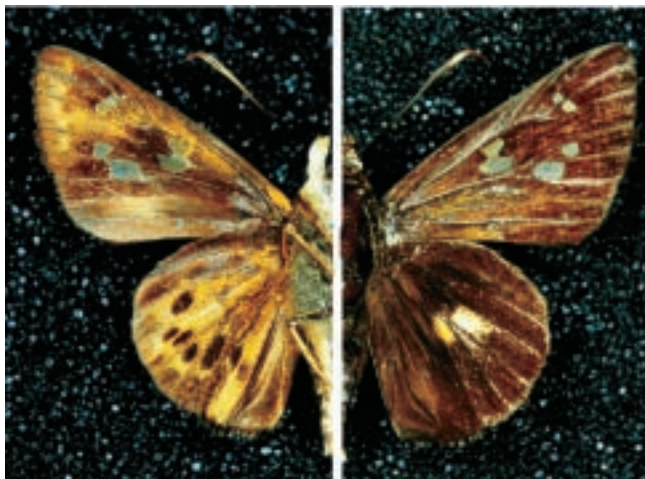
- Ferguson-Lees, J. and Christie, D.A., 2001. *Raptors of the World*. Houghton Mifflin, Company.
- Griffiths, R. and Tsim, S.T. *Post Release Monitoring of Rehabilitated White-bellied Sea Eagles* 2002. (In prep.)
- MacKinnon, J. and Phillipps K., 2000. *A Field Guide to the Birds of China*. Oxford University Press.
- Mougeot, F., Thibault, J.-C. and Bretagnolle, V., 2002. Effects of territorial intrusions, courtship feedings and mate fidelity on the copulation behaviour of the osprey. *Animal Behaviour*, 64: 759-769.
- Newton, I., 1990. *Birds of Prey*. New York: Weldon Owen Inc.
- Zheng, G. and Wang, Q. eds., 1998. *China Red Data Book of Endangered Animals - Aves*. National Environmental Protection Agency. Endangered Species Scientific Commission, P.R.C. Science Press.

Working Group Column

New Butterfly Record for Hong Kong - *Thoressa monastyrskyi*

Eric Wong, PC Leung, Phoebe Sze, Alfred Wong, Vinci Li, Butterfly Working Group

本署職員於2002年捕捉到一隻弄蝶科蝴蝶，後確認為首次在香港發現的黑斑陀弄蝶 *Thoressa monastyrskyi*。



Specimen of *Thoressa monastyrskyi* (upper side/under side)

On 17 May 2002, at Yung Shue O in Sai Kung West Country Park, a live butterfly specimen was caught by Mr Chu Kwok Wai (FA/NC1). On careful examination of the genitalia structure, the specimen was confirmed to be the species *Thoressa monastyrskyi*, a member of the Hesperiiidae. Last year, *Thoressa monastyrskyi* was confirmed a new species to science from a small number of specimens collected in Vietnam (Devyatkin, 2002). This was the first *Thoressa* species recorded in Hong Kong.

The specimen caught by Mr Chu was a male, with forewing length of about 18mm. The forewing is blackish-brown, with slightly yellow hyaline spots on both the upperside and underside. The hindwing has a similar colour to the forewing. The wing base of the upperside has greenish-yellow hairs, while the underside has a series of postdiscal black spots and one spot near the base.



Thoressa monastyrskyi

The genus *Thoressa* includes about 20 species, known from east and southeast Asia, and nine of which occur in China (Chou, 1998). There is little recorded information for *Thoressa monastyrskyi*.

The site was visited again on 7 May 2003 by AFCD staff, and another live male specimen was found.

References

- Chou, I., 1998. *Classification and Identification of Chinese Butterflies*. Henan Scientific and Technological Publishing House.
- Devyatkin, A.L., 2002. *Atalanta* 33 (1/2): 601, pl. X, f. 7, 8.



Male genitalia *Thoressa monastyrskyi*

Four New Dragonfly Records for Hong Kong

TAM Tze-wai, Dragonfly Working Group

香港在2003年夏初增加了四個蜻蜓新記錄，令蜻蜓品種數目增至 111 種。即將出版的香港蜻蜓圖鑑將包括這四個新記錄。

Four new dragonfly species were recorded at the start of the 2003 dragonfly flying season. They were: *Anax nigrofasciatus nigrofasciatus* (黑紋偉蜓 Blue-spotted Emperor), *Cephalaeschna klotsi* (克氏頭蜓 Yellow-spotted Dusk-hawker), *Pseudagrion pruinosum frasei* (赤斑蟳 Ferruginous-faced Sprite) and *Trithemis pallidinervis* (灰脈褐蜻 Dancing Dropwing).

The first new record, a male *Pseudagrion pruinosum frasei*, was collected on 23 April 2003 by Tam Tze-wai, near a lowland stream that drains from Lau Shui Heung Reservoir. This damselfly belongs to Family Coenagrionidae (蟳科). The male is easily distinguished from other *Pseudagrion* (斑蟳屬) species by its orange upper mouth part (labrum and clypeus), red face, red anterior part of frons, and red lower half of eyes. Its synthorax and dorsal part of the ninth and tenth abdominal segments are pruinosed blue. This species, tolerant of mild organic stream pollutants, is widespread in Guangdong's agricultural foothills.

The second new record, a male *Anax nigrofasciatus nigrofasciatus*, was made on 25 April 2003 by Boris Kwan, near a small pond on the northern side of Ma On Shan. This species belongs to Family Aeshnidae (蜓科). Colourful blue spotting on its abdomen and thick black sutures on the sides of its synthorax distinguish it from the other *Anax* (偉蜓屬) species of Hong Kong. It has been observed on two previous occasions, in 1994 and 2002, by Keith Wilson at Sha Lo Tung. But this is the first confirmed record with a specimen collected. *A. n. nigrofasciatus* is found in China (including Guangxi, Guangdong and Taiwan), Japan, Korea and the Philippines.

The third new record was a teneral female *Cephalaeschna klotsi* made on 25 April 2003 by Woo Ting-kwong and Hui Wing-leung, Field Officers of the Country Park Ranger Services Division, at the waterfall of Ng Tung Tsai in the Tai Mo Shan Country Park. The



Pseudagrion pruinosum frasei ♂

female has large bright yellow frons and a brown abdomen with yellow spots. The adult female of this species has broad black and yellow strips in the synthorax, black and yellow abdomen with pairs of yellow spots between segments on the dorsal surface. This species, belonging to the Family Aeshnidae, was first described by Asahina (1982) from Fukien Province. It is a rare, little known species, and mainly crepuscular in activity. *Cephalaeschna klotsi* is the only species belonging to the Genus *Cephalaeschna* (頭蜓屬) found in Hong Kong.

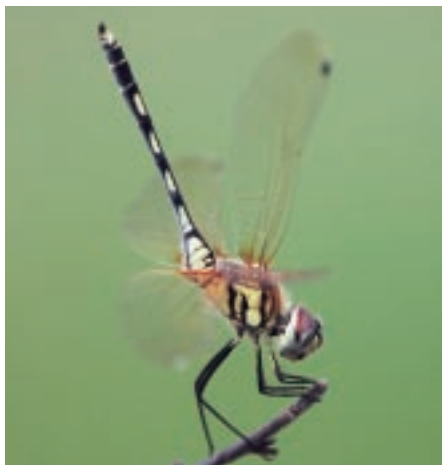


Cephalaeschna klotsi ♀

The latest new dragonfly record was made on 20 May 2003 by Graham Reels, who discovered several individuals of *Trithemis pallidinervis* in a shallow wetland newly created by the Kowloon-Canton Railway Corporation at Kam Tin. This species belongs to Family Libellulidae (蜻科), whose members dominate the dragonfly fauna of most regions of the world and account for nearly one third of the species found in Hong Kong. Both males and females of *T. pallidinervis* possess very long, spidery legs relative to other members of the Genus. The pterostigma is black with a small white distal portion. They frequent marshes and still waters - but not streams. This species occurs in Bangladesh, Burma, China (including Taiwan), Indonesia, India, Laos, Nepal, Oman, Peninsular Malaysia, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.



Anax nigrofasciatus nigrofasciatus ♂



Trithemis pallidinervis ♂

The addition of these four new dragonflies has increased the total number of dragonfly species recorded in Hong Kong from 107 (Wilson, 1997) to 111. Descriptions of each of the previous 111 species can be found in a new field guide to the dragonflies of Hong Kong by Wilson *et al.* (2003).

References

- Asahina, S., 1982. Studies on the Chinese dragonflies of the genus *Cephalaeschna* and its allies in the collection of the Leiden Museum. *Tombo*, 25 (1-4): 7-15.
- Wilson, K. D. P., 1995. *Hong Kong dragonflies*. Urban Council of Hong Kong. Hong Kong. p.211.
- Wilson, K. D. P., 1997. An annotated checklist of the Hong Kong dragonflies with recommendations for their conservation. *Memoirs of the Hong Kong Natural History Society*, 21: 1-68.
- Wilson, K. D. P., Tam, T. W., Kwan, B. S. P., Wu, K. K. Y., Wong, B. S. F. and Wong, J. K., 2003. *A field guide to dragonflies of Hong Kong*. (Under preparation)

Illigera celebica at the Shing Mun Arboretum

Patrick Lai and Joseph Yip, Hong Kong Herbarium

本文敘述本署於城門標本林栽培寬藥青藤的成果。其中，在寬藥青藤上及在附近發現以寬藥青藤為寄主植物的燕鳳蝶幼蟲及成蟲，尤其令人鼓舞。

The Shing Mun Arboretum was established in the early 1970s, for *ex-situ* plant conservation and as an outdoor classroom to complement the Hong Kong Herbarium for studying living specimens of native plants in Hong Kong. The Arboretum has been recently enriched with a new climber collection, one species of which is the *Illigera celebica* (寬藥青藤, *Illigera*). When we visited the Arboretum in June this year, most of the leaves of the *Illigera* were half-eaten. The plants looked miserable, with an appearance that most gardeners or horticulturists would not like to see.

On closer examination, there were numerous caterpillars feeding on the leaves and almost none of the leaves remained intact. The tiny creatures are not some kind of “pest” but the larvae of an uncommon butterfly, the White Dragontail (燕鳳蝶, *Lamproptera curius*). We also noticed a few adults nearby, flying restlessly like dragonflies. The co-existence of the butterflies and their food plant was, despite the “plant damage”, a good sign of biodiversity conservation.

There is only one species of *Illigera* in Hong Kong. S.T. Dunn named it as a new species *Illigera platyandra*, in the 1908 in the *Journal of the Linnean Society, Botany* – based on a specimen originally collected in Wong Nai Chung and cultivated in the Hong Kong Botanical Garden. The scientific name was later on considered as a synonym of *Illigera celebica*, with a distribution range from Yunnan, Indochina to Malaysia.

Illigera has local conservation interest because it is the larval food plant of the uncommon and elegant

White Dragontail, and also because of its own local rarity. It has been recorded from only a few localities in Fung Yuen, Sai Kung, She Shan Tsuen and Tai Mo Shan. The species is listed in the Forestry Regulations, a subsidiary legislation of Forests and Countryside Ordinance, Cap. 96. Collection, selling or possession of this species are prohibited.

Several trials of propagating *Illigera* have been carried out in the last few years, but all attempts by cutting have not been promising. However, seeds collected from various locations have had fairly good germination rates (c.a. 30%) and the young seedlings have had relatively high survival rates. A few batches of *Illigera* seedlings have been raised in the nursery and reintroduced to suitable locations in the natural or semi-natural environment (e.g. Tai Tong, Shing Mun Arboretum and Fanling). The populations appear to be establishing quite well. Indeed, the above recent observation of White Dragontail larvae feeding on the *Illigera* growing at Shing Mun Arboretum is an encouraging initial sign of our conservation work for the *Illigera* and White Dragontail.



Illigera celebica

Survey of Hong Kong Non-flying Terrestrial Mammals by Camera Trapping in 2002

Shek Chung-tong, Mammal Working Group

在 2002 年的陸上哺乳類動物調查中，我們於 17 個郊野公園及 2 個自然保護區內，共裝置了 140 部紅外線自動相機，並錄得 588,580 相機拍攝小時和 4,189 張共 17 個品種的中型及大型陸上哺乳類動物的照片。根據這些相機所記錄到的各品種的相對出現數目和出現的相機百分比，並考慮牠們是否外來或害獸品種之後，我們評估了各品種的現有狀況和其生態的價值。評估的結果是，在 17 個品種之中，食蟹獾、穿山甲和水獺被列為可考慮優先加強保育的稀有及分佈狹窄的本地品種。

Introduction

The land mammals that inhabit Hong Kong's natural environment can be classified into seven orders, 19 families, 35 genera, and 52 species. Among these, 22 species are flying mammals, such as bats, and ten species are small mammals (head-to-body length < 30 cm), including shrews, rats and squirrels. The remaining 20 species are medium (head to body length is 30-60 cm) to large (head-to-body length > 60 cm) mammals, such as Wild Boar, Masked Palm Civet and Rhesus Macaque (Nowak, 1991).

Much of our knowledge about Hong Kong's mammalian biodiversity is scattered through the literature, and it is based on different survey methods. This historical data is insufficient to provide an adequate baseline against which the status of Hong Kong mammals can be currently assessed. Given this, a long term monitoring program of medium to large mammals by camera trapping was begun in 2002. Its overall aim is to estimate the species diversity, abundance and spatial distribution of mammalian species throughout Hong Kong. It will also give baseline information to identify changes in the populations that are of conservation concern.

Camera trapping has been widely used in monitoring wildlife diversity for over 30 years (Karanth and Nichols, 1998). It is a non-invasive method, and it records data more consistently than by other

traditional methods. However, the camera trapping cannot easily identify small mammals and thus only medium and large mammals are covered in this study.

Methodology

A total of 140 auto-trigger cameras (model: Wildlife TWO by Wildlife Conservation Foundation Ltd.) were installed in 17 Country Parks, and at the Tai Po Kau and Mai Po Inner Deep Bay Nature Reserves. The auto-trigger cameras were attached individually to tree trunks, about 1.5 to 2.5 meters above ground, with their locations chosen to cover different types of habitats and terrain in the various study areas. Film collection and battery replacement were done every 2 to 4 weeks for each camera, depending on the abundance of local wildlife. The camera operating hours for each roll of film was the time span between the starting time of a new roll of film, i.e. the time recorded on the first photo, and the end time, i.e. the time recorded on the last photo. The relative abundance of each species was measured by the Occurrence Index (OI), the number of photos taken of a particular mammal species in a particular area per 1,000 camera working hours. The extent of distribution of a species was measured by the percentage of camera locations (out of 140 locations) at which a particular species was recorded.

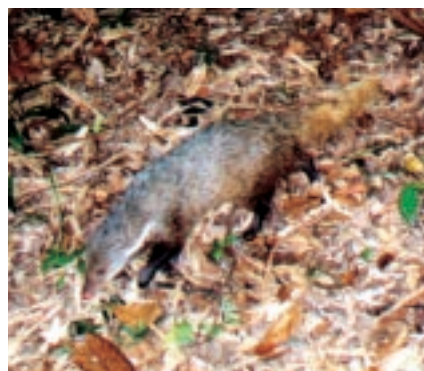
Result and Discussion

A total of 588,580 camera working hours were logged by the 140 cameras in the 2002 survey. During this period, 4,189 photos of 17 species of medium and large mammals were recorded (Table 1).

Of these 17 species, Stray Dog, Feral Cattle and Feral Cat are introduced species, and have minimal conservation value. Stray Dog ranked fifth in relative abundance and are widespread throughout Hong Kong. This suggests that significant populations of Stray Dog have become established in Hong Kong's natural environment, and they may prey on, and pose threats to, other native wildlife (Dahmer, 2002). In addition, Javan Mongoose and Yellow-bellied Weasel, both recently recorded, are likely to be species which have expanded into Hong Kong, naturally or as a result of deliberate release of individuals outside their natural range. Although relatively less abundant and limited in distribution, their priority for conservation action is lower because of their possible non-native status.



Chinese Pangolin 穿山甲 *Manis pentadactyla*



Crab-eating Mongoose 食蟹獾 *Herpestes urva*



Chinese Otter 水獺 *Lutra lutra chinensis*

Among the native medium and large mammals, the Porcupine and Indian Muntjac were most abundant and widely distributed, while Small Indian Civet, Wild Boar, Chinese Ferret Badger, Masked Palm Civet and Chinese Leopard Cat were relatively abundant and widespread. Rhesus Macaque was also relatively abundant, but its distribution was relatively limited, mostly to the Kowloon Hills area.

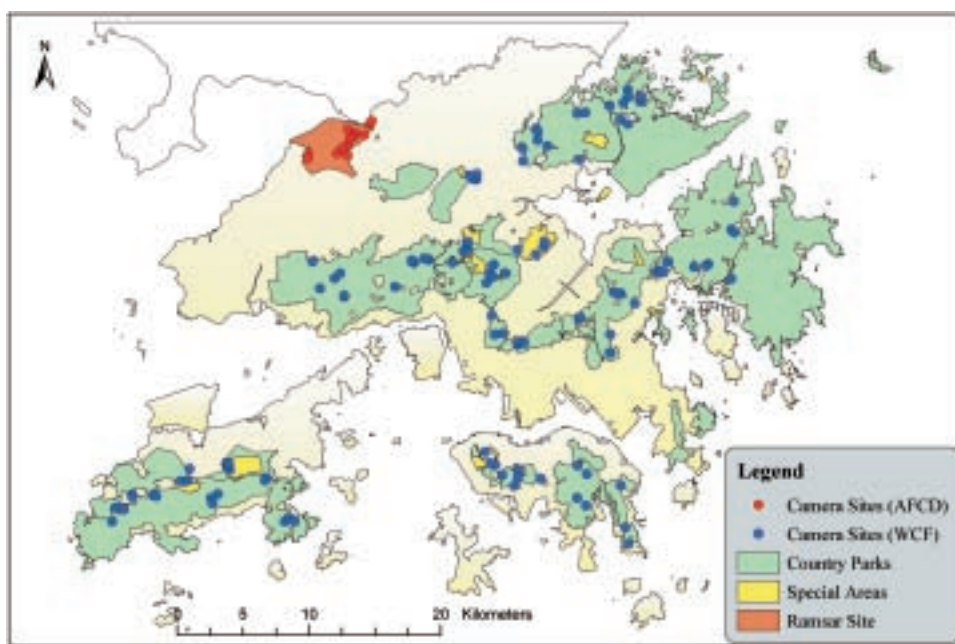
However, Crab-eating Mongoose, Chinese Pangolin, Chinese Otter and Greater Bandicoot Rat were relatively rare, with restricted distribution. Though being locally rare, the Greater Bandicoot Rat is considered an agricultural pest in the grain crops in other Asian countries and their occurrence is always linked to the agricultural activities. The local rarity of Greater Bandicoot Rat is probably related to the decline in Hong Kong's rice farming. In view of its status as a pest in many areas in the region, this species can be considered to have a lower priority for conservation action. After excluding Greater Bandicoot Rat, the species which may be considered for enhanced conservation include Crab-eating Mongoose, Chinese Pangolin, and Chinese Otter, which are rare native species with restricted Hong Kong distribution.

This camera trapping survey is a long term monitoring program for medium and large mammals

in Hong Kong, and more protected areas will be covered in the survey of 2003. In addition, extra effort, and more cameras, will be given to sites where rare native species with restricted distribution have been found, such as Plover Cove CP and Pat Sin Leng CP for Crab-eating Mongoose, Lam Tsuen CP for Chinese Pangolin, and Mai Po Inner Deep Bay Nature Reserve for Chinese Otter.

References

Dahmer, T.D., 2002. Feral/stray dogs and civet mortality on Kau Sai Chau, 2001-2002. *Porcupine!*, 27: 7-9.
 Karanth, K. U., and J. D. Nichols., 1998. Estimating tiger densities in India from camera trap data using photographic captures and recaptures. *Ecology*, 79:2852-2862.
 Nowak, R. M., 1991. *Walker's Mammals of the World*. 5th ed. Johns Hopkins University Press, Baltimore, Maryland.



Location of the 140 camera sites.

Table 1. Results of medium and large mammal survey by camera trapping in 2002

Common Name	Species Name	Photos*	OI*	% camera*	Status*
Porcupine (豪豬)	<i>Hystrix brachyura</i>	974	1.643	61.4%	Native
Indian Muntjac (赤麂)	<i>Muntiacus muntjak</i>	618	1.043	75%	Native
Small Indian Civet (小靈貓)	<i>Viverricula indica</i>	483	0.815	65%	Native
Wild Boar (野豬)	<i>Sus scrofa</i>	445	0.751	57.1%	Native
Stray Dog (野狗)	<i>Canis familiaris</i>	411	0.693	57.1%	Introduced
Chinese Ferret Badger (鼬獾)	<i>Melogale moschata</i>	326	0.550	50.7%	Native
Masked Palm Civet (果子狸)	<i>Paguma larvata</i>	234	0.395	50%	Native
Rhesus Macaque (獼猴)	<i>Macaca mulatta</i>	219	0.369	19.3%	Native**?
Chinese Leopard Cat (豹貓)	<i>Felis bengalensis</i>	153	0.258	43.6%	Native
Javan Mongoose (紅頰獾)	<i>Herpestes javanicus</i>	119	0.201	15%	Introduced?
Feral Cattle (黃牛)	<i>Bos taurus</i>	82	0.138	15.7%	Introduced
Feral Cat (野貓)	<i>Felis catus</i>	70	0.118	15.7%	Introduced
Crab-eating Mongoose (食蟹獾)	<i>Herpestes urva</i>	27	0.046	5.7%	Native
Chinese Pangolin (穿山甲)	<i>Manis pentadactyla</i>	11	0.019	6.4%	Native
Yellow-bellied Weasel (黃腹鼬)	<i>Mustela kathiah</i>	8	0.013	2.1%	Introduced?
Chinese Otter (水獺)	<i>Lutra lutra chinensis</i>	5	0.008	2.1%	Native
Greater Bandicoot Rat (鬼鼠)	<i>Bandicota indica</i>	4	0.007	3.6%	Native
Total :	17 species	4189	7.067	140	

*Photos: Number of photos recorded; OI: Occurrence Index of mammalian species; % camera: Percentage of cameras with the mammal species; Status: status subject to further verification are marked with a "?"

**Believed to be re-introduced populations

Book Review

Invasive Alien Species in China (中國外來入侵種)

LI Zhen-yu and XIE Yan (Eds.). *China Forestry Publishing House (2002) (In Chinese)*. ISBN: 7-5038-3277-0

Virginia Lee

《中國外來入侵種》一書詳細介紹了外來入侵種在中國的現狀，及其對經濟、環境、生物多樣性、人類健康所造成的影響與成因，並詳述了127種外來入侵種的分佈地區、鑒別特徵、生物學特性、原產地、引入擴散原因和危害，以及如何進行控制等。

The prevention, control and management of Invasive Alien Species (IAS) is a major issue highlighted in the Convention of Biological Diversity (CBD). According to the International Union for the Conservation of Nature (IUCN) (2000), IAS are defined as alien species (non-native, non-indigenous, foreign, exotic) which become established in natural or semi-natural ecosystems or habitats, act as agents of change, and threaten the existing native biological diversity. The Union has rated IAS as the second greatest threat to global biodiversity after habitat loss. The book *Invasive Alien Species in China* is the most comprehensive publication to date, which addresses the situation, effects and management of IAS in China. The book is the product of on-going research, extensive literature review and the implementation of management measures contributed by the Eco-security Task Force (former Biodiversity Working Group) of the China Council for International Cooperation on Environment and Development (CCICED).

The book begins with a broad, informative overview of IAS in China, illustrated by various examples. It highlights the biological and ecological characters of invaders and the degrees of susceptibility of different habitats/ ecosystems to 'invasives'. The next section describes the mechanisms and pathways for alien species introductions. Major pathways are classified

into two categories: intentional and unintentional introductions. The associations between human activities and IAS establishment are discussed in Section 3. The book moves on to a review of the species diversity of 'invasives' in China. The threats that these IAS pose to China are further elaborated in Section 5. Section 6 lists the international organizations and agreements relevant to China with regard to IAS. It provides the criteria and procedures to assess the potential risk of IAS, so as reach decisions on necessary actions to detect and combat IAS in their initial stages. The final section considers the strategies, measures and techniques to control, regulate and eradicate IAS.

The main body of the book, with 127 examples of IAS in China, is organized into two parts: fauna and flora. Each case study has brief notes on taxonomy, biology/ diagnostic features, the country of origin, local distribution, introduction pathways, impacts, management and control methods concerning 'invasives'. A few of the 127 IAS are 'native invasives' (or 'local invasives') rather than 'aliens', which nonetheless have extended to modified habitats beyond their natural distribution ranges - often due to human activities, as well as accidental introductions. Examples of these 'native invasives' include grass carp and long-legged ant.

In the concluding pages, the authors note that several taxonomic groups, including fungi, bacteria, viruses and other micro-organisms, have been left out from the book - this because there is very little available information about them. The authors also urge the public to help to inspect and report any new invading species that they may find.

For further information, please visit CCICED's website at www.chinabiodiversity.com. Copies of the book are also available from AFCD's departmental library, or from the book collection of the Biodiversity Conservation Division.

References

IUCN guidelines for the prevention of biodiversity loss caused by alien invasive species. 2000. IUCN, Gland, Switzerland.

Contribution to the *Hong Kong Biodiversity*

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